Fast Force-Directed/Simulated Evolution Hybrid For Multiobjective VLSI Cell Placement

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Summary

VLSI standard cell placement is a hard optimization problem, which is further complicated with new issues such as power dissipation and performance. In this work, a fast hybrid algorithm is designed to address this problem. The algorithm employs simulated evolution (SE), an iterative search heuristic that comprises three steps: evaluation, selection and allocation. Solution quality is a strong function of the allocation procedure which is both time consuming and difficult. In this work a force directed approach in the allocation step of SE is used to both accelerate and improve the solution quality. Due to the imprecise nature of design information at the placement stage, objectives to be optimized are expressed in the fuzzy domain. The search evolves towards a vector of fuzzy goals. The proposed heuristic is compared with a previously presented SE approach. It exhibits significant improvement in terms of runtime for the same quality of solution.